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*as Florence Hedges*

# THE PLANT DISEASE REPORTER

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Supplement 46

A Preliminary Report of Surveys for Plant Diseases

In East China

June 1, 1926

BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE





# A PRELIMINARY REPORT OF SURVEYS FOR PLANT DISEASES IN EAST CHINA

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Collaborator with the Plant Disease Survey.

Plant Disease Reporter  
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## Foreword

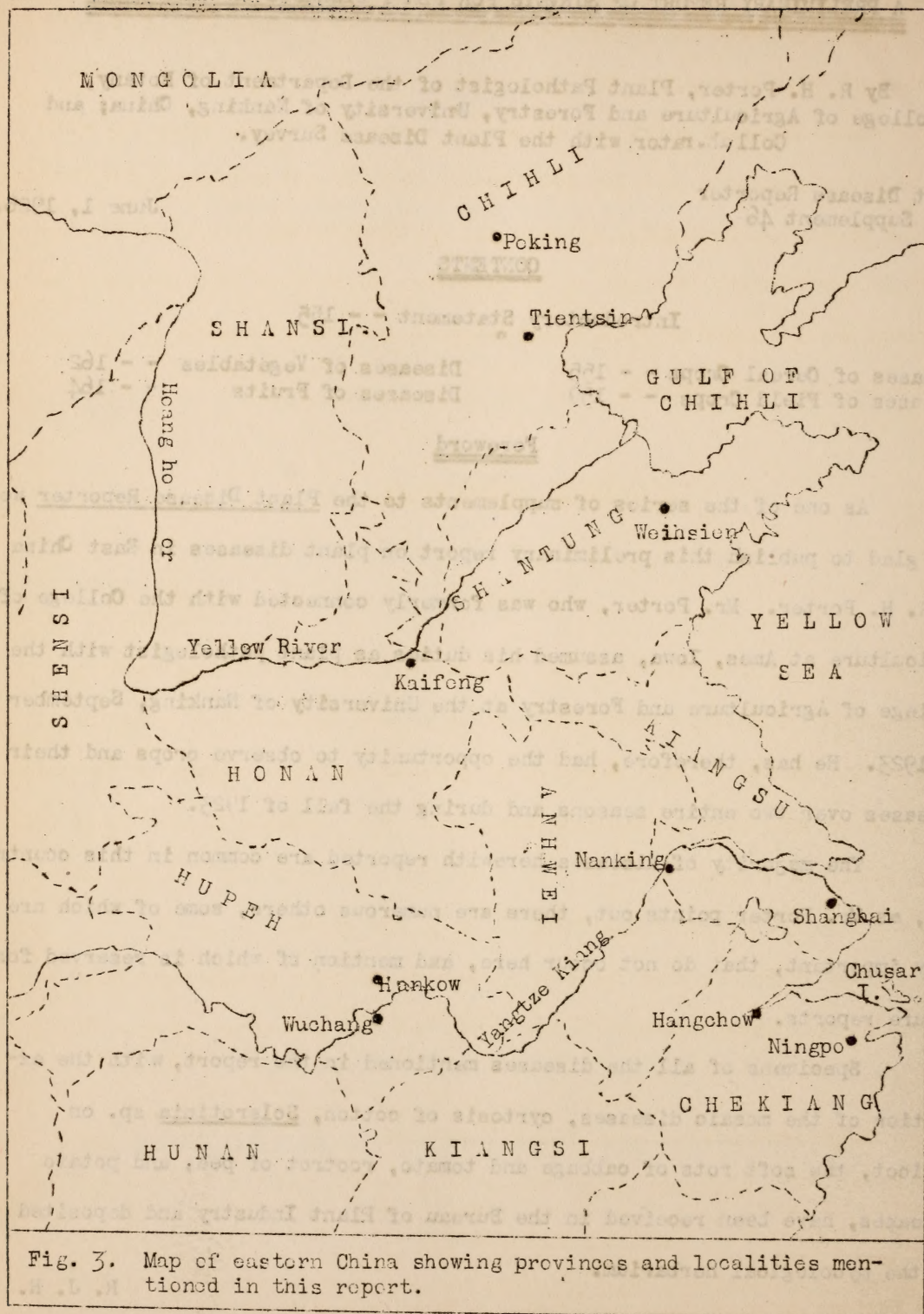
As one of the series of supplements to the Plant Disease Reporter we are glad to publish this preliminary report on plant diseases in East China by R. H. Porter. Mr. Porter, who was formerly connected with the College of Agriculture at Ames, Iowa, assumed his duties as plant pathologist with the College of Agriculture and Forestry at the University of Nanking, September 1, 1923. He has, therefore, had the opportunity to observe crops and their diseases over two entire seasons and during the fall of 1923.

The majority of diseases herewith reported are common in this country but, as Mr. Porter points out, there are numerous others, some of which are very important, that do not occur here, and mention of which is reserved for future reports.

Specimens of all the diseases mentioned in the report, with the exception of the mosaic diseases, cyrtosis of cotton, Sclerotinia sp. on apricot, the soft rots of cabbage and tomato, rootrot of pea, and potato diseases, have been received in the Bureau of Plant Industry and deposited in the mycological herbarium.

R. J. H.





## INTRODUCTORY STATEMENT

During the past two years the Division of Plant Pathology of the University of Nanking has been making surveys in certain localities of East China for those diseases which are common on economic crops. These surveys are by no means complete, but the preliminary results are presented now for the purpose of giving an indication of some of the factors which are responsible for certain low yields. Not all of the diseases which have been observed on these crops are included in this report because the causal agents of some of them have not been determined.

## DISEASES OF CEREAL CROPS

### BARLEY

Both smuts of barley are very widespread. They have been observed wherever barley is grown. Furthermore it should be noted that a large percentage of the barley in East China is of the hulless type, which may account in part for certain high percentages observed. For example, in one field near Nanking there was a total of 23 per cent of smut, including both loose and covered. Other fields contained from 10 to 15 per cent.

Barley stripe is more or less prevalent; certain fields have been observed to contain approximately 10 per cent, but the average of course is not this high.

### Estimated percentage losses from barley diseases:

Loose smut, <u>Ustilago nuda</u> (Jens.) Kell. & Sw. - - - - -	3.6
Covered smut, <u>U. hordei</u> (Pers.) Kell. & Sw. - - - - -	4.3
Black stem rust, <u>Puccinia graminis</u> Pers. - - - - -	Trace
Dwarf leaf rust, <u>P. anomala</u> Rostr. (P. simplex) - - - - -	Trace
Powdery mildew, <u>Erysiphe graminis</u> DC. - - - - -	2.0
Stripe, <u>Helminthosporium gramineum</u> Rabh. - - - - -	3.0
Net blotch, <u>Pyrenophora teres</u> (Died.) Drechs. - - - - -	1.0



The Physoderma disease of corn was not observed around Nanking in 1924, but during the wet season of 1925 it was quite common in the region of Nanking. It was also observed as far north as Weihsien, Shantung, which is in the northern part of the province. The leaf spot of corn caused by a species of *Helminthosporium* is common in every corn field around Nanking.

Estimated percentage losses from corn diseases:

Leaf spot, <i>Helminthosporium</i> sp. - - - - -	7
Smut, <i>Ustilago zeae</i> (Beckm.) Ung. - - - - -	4
Brown spot, <i>Physoderma zeae-maydis</i> Shaw - - - - -	3

KAOLIANG (GRAIN SORGHUM)

Both the kernel and head smuts of kaoliang are more or less common. In addition there are three leaf spot diseases which vary in severity in different localities. Anthracnose seems to be widely distributed, and in northern Anhwei Province was observed to cause severe loss. In Honan Province around Kaifeng *Cercospora* leaf spot was by far the most important. It was very difficult to find a plant in any of the fields which was entirely free from this disease.

Estimated percentage losses from kaoliang diseases:

Leaf spot, <i>Cercospora</i> sp. - - - - -	5
Loose kernel smut, <i>Sphacelotheca cruenta</i> (Kühn) Potter - - - - -	4
Anthracnose, <i>Colletotrichum lincola</i> Cda. - - - - -	4
Leaf stripe, <i>Septoria pertusa</i> Heald & Wolf - - - - -	4
Head smut, <i>Sorosporium reilianum</i> (Kühn) McAlp. - - - - -	3

MILLET

In individual cases the smut of millet has been observed to run as high as 50 per cent. This was especially true in Weihsien, Shantung. The



average, of course, is much lower. Downy mildew of millet seems to be quite widespread over North China. Personal observations were made in northern Anhwei, Shantung, and Honan Provinces. Samples have also been received from the region around Peking and from southern Shansi. This would indicate that downy mildew is one of the most common and destructive diseases of millet. Rust also is very widespread on millet, causing considerable loss. The leaf spot caused by a species of *Helminthosporium* is less common, yet may be found in nearly every field.

Estimated percentage losses:

Smut, <i>Ustilago crameri</i> Korn. - - - - -	8
Downy mildew, <i>Sclerospora graminicola</i> (Sacc.) Schroet. - - - - -	6
Rust, <i>Uromyces leptodermus</i> Sydow ( <i>U. setariae-italicae</i> ) - - - - -	5
Net blotch, <i>Helminthosporium</i> sp. - - - - -	1

OATS

Wild oats are commonly infected with loose smut, *Ustilago avenae* (Pers.) Jens., but the cultivated oat is not grown in the region of Nanking. Dr. H. H. Love, who was in the northern part of China (Chihli Province) during the summer of 1925, reported that on oats in that region, especially on certain experimental plots, smut ran as high as 80 per cent. This was principally on a hullless variety.

WHEAT

Wheat is by far the most important winter crop throughout East China, and is attacked by a large number of diseases. In Chekiang Province, *Puccinia graminis* seems to appear early, causing considerable loss. This is also true in the region of Wuchang, Hupeh. Around Nanking the loss from this disease varies



with the season. The leaf rust and stripe rust, however, are more serious factors than the black stem rust. Powdery mildew, in the vicinity of Nanking, appears earlier than any of the rusts and on certain varieties completely covers the stems and leaves. On the whole it causes more loss than any of the rusts. Loose smut of wheat is quite widespread, but seldom reaches a high percentage. Flag smut seems to be almost as widespread as the loose smut and causes losses ranging from a trace to 20 per cent. Scab of wheat was a serious factor during 1925 only in the region of Ningpo, Chekiang Province. Nematode of wheat, however, is as widely distributed as either of the smuts and causes serious loss.

Estimated damages:

Leaf rust, Puccinia triticina Eriks. - Loss 4%.

Nanking: April 1925, developing as season advanced.

Hankow-Chekiang: April 27, abundant.

Ningpo and Chusan: May 15, very prevalent.

Black stem rust, Puccinia graminis Pers.

Nanking: Trace.

Ningpo: May 13, severe in certain places.

Wuchang, Hupeh: Severe.

Stripe rust, Puccinia glumarum (Schm.) Eriks. & Henn.

Nanking: Quite common and destructive under favorable conditions, appears later than P. triticina.

Samples have been received from Weihsien, Sung.

Powdery mildew, Erysiphe graminis DC.

Nanking: Destructive, especially on late maturing varieties. April 11, very prevalent - 4%.

Hangchow: On wheat 10%; quack grass 5%.

Chusan: 10%.

Loose smut, Ustilago tritici (Pers.) Rostr.

Nanking: 2 to 5%.

Hangchow: 2 to 3%.

Chusan: 2 to 4%.



Flag smut, Urocystis tritici Körn.

Nanking: Trace to 20%.

Nanhsuchow: 2 to 4%.

Kaifeng: 3%.

Weihhsien: Trace.

Scab, Gibberella saubinetii (Mont.) Sacc.

Ningpo: 1 to 4%. (Bearded wheats had a higher percentage than native.

Nanking: Trace.

Nematode, Tylenchus tritici (Stein.) Bast.

Nanking: 1924 very destructive; 1925 common.

Nanhsuchow: Also common.

### DISEASES OF FIELD CROPS

#### BROAD BEANS

These beans, known botanically as Vicia faba, constitute one of the most important winter crops in the Lower Yangtze Valley. Besides mosaic, they have a high percentage of rust each year. There are other diseases of the broad bean, which are under investigation and which cause even more loss than rust and mosaic combined.

Estimated percentage losses:

Rust, <u>Uromyces fabae</u> (Pers.) D By. - - - - -	5
Mosaic, cause unknown - - - - -	2

#### COTTON

Anthrachnose is very common on American varieties of cotton, but the Chinese varieties seem to be less susceptible. The past season it was particularly severe, reducing the yield of American cotton from 5 to 15 per cent. Cyrtosis also is more severe on American cotton than on Chinese. In Honan

Province the leaf spot caused by a species of *Phyllosticta* was observed but the species is questionable for the simple reason that we are lacking in host indices for the determination of fungi.

Estimated percentage losses:

Anthracnose, <i>Glomerella gossypii</i> (South.) Edg. - -	5
Cyrtosis, caused by leaf hoppers - - - - -	6
Leaf spot, <i>Phyllosticta</i> sp. - - - - -	2

COWPEA

The loss in yield of cowpea is very similar to that listed for field beans.

Estimated percentage losses:

Rusts, <i>Uromyces vignae</i> A. Barclay and <i>Uromyces</i> <i>appendiculatus</i> (Pers.) Link - - - - -	6
Mosaic, cause unknown - - - - -	5

FIELD BEAN

Field beans include a large variety of Chinese beans. One of the principal ones is the green bean. On all of these beans rust is a serious factor, reducing the yield from 2 to 10 per cent. Leaf spot is also of considerable importance, the green bean being especially susceptible.

Estimated percentage losses:

Rust, <i>Uromyces appendiculatus</i> (Pers.) Link - - - -	6
Leaf spot, <i>Cercospora</i> sp. - - - - -	4
Mosaic, cause unknown - - - - -	3

FLAX

No fields of flax have been observed because it is grown principally in North China. However, a sample was received from this region which was



severely infected with rust, Melampsora lini DC., indicating that this disease is a limiting factor in flax production.

### RAPE

Rape is very common throughout the Yangtze Valley region, being used principally for oil, which is pressed from the seed. In the spring, downy mildew is very common, especially if the weather is damp and cool, as the crop approaches maturity. The leaf spot caused by Alternaria brassicae is present in nearly every field.

#### Estimated percentage losses:

Downy mildew, Peronospora parasitica (Pers.) D By. - 2 - 5  
 Leaf spot, Alternaria brassicae (Berk.) Sacc. - - - 1 - 3

### SOYBEAN

The most common disease of soybean in China is mosaic, the loss from which is difficult to estimate but it is thought to be about 6 per cent. It seems to be much more common than in the middle western United States, where the writer has made observations.

### SUNFLOWER

This crop is grown quite widely by the Chinese, and the seed is used for various purposes. Rust, Puccinia helianthi-mollis (Schw.) Jack., is very common, but seems to come on so late that little damage is caused. The same is true of powdery mildew, Erysiphe cichoracearum DC.

DISEASES OF VEGETABLESBEAN

Practically all varieties of beans are attacked by rust. Leafspot is also quite common and mosaic is very generally distributed.

Estimated percentage losses:

Rust, <u>Uromyces appendiculatus</u> (Pers.) Link	- - - - 5
Leaf spot, <u>Cercospora</u> sp.	- - - - - 4
Mosaic, Cause unknown	- - - - - 3

BEET

Leafspot of beets, Cercospora beticola Sacc., is widespread, in many cases the entire leaf surface being covered with the spot. In individual cases it is estimated that the loss caused by this disease is 15 per cent, but for East China 5 per cent probably represented the average.

CABBAGE

Early blight is very common, and there is a soft rot, the cause of which has not been determined definitely, which is quite destructive during wet weather.

Estimated percentage losses:

Early blight, <u>Alternaria brassicae</u> (Berk.) Sacc.	- - 2
Soft rot, Bacteria	- - - - - 4

CUCUMBER

During the past year there was only a slight trace of downy mildew. In the fall of 1923 this disease was very destructive not only on cucumbers but



also on squash. A very noticeable thing about Chinese long cucumber is its freedom from mosaic, only a few plants having been observed with this disease.

Estimated percentage losses:

Downy mildew, <u>Pseudoperonospora cubensis</u> (Berk. & Curt.) Rostew. - - - - -	5
Mosaic, Cause unknown - - - - -	Trace

PEA

Rootrot, cause not determined, caused a loss estimated at 6 per cent.

PEANUT

Wherever peanuts are grown the leafspot, Septogloeum arachidis Rac., is very common. In the region of Kaifeng, Honan, where a number of foreign varieties have been introduced, it is quite destructive.

POTATO

Although potatoes are not widely grown in China there are certain regions where this crop is of some importance. Scab and early blight are of common occurrence. Mosaic seems to be widespread in regions having climate similar to that of Nanking, where the spring and summer are usually humid and hot.

Estimated percentage losses:

Scab, <u>Actinomyces scabies</u> (Thax.) Gussow - - - - -	5
Stem end rot, <u>Fusarium</u> sp. - - - - -	4
Early blight, <u>Alternaria solani</u> (Ell. & Mart.) Jones & Grout - - - - -	2
Mosaic, Cause unknown - - - - -	3

SPINACH

Downy mildew, Peronospora effusa (Grev.) Ces. caused a trace of loss.

SQUASH

Mosaic, cause unknown, is very common but the loss apparently is slight.

TOMATO

Samples of tomato plants have been received from West China, which were infected with Fusarium wilt. Observations were made in North China in the provinces of Shantung and Honan, where this disease was destroying 75 per cent of the plants. Mosaic in the region of Nanking is perhaps the most severe disease that we have to contend with. In our gardens last summer the early planted vines suffered 80 per cent damage. There was also a soft rot of fruit which appears during the season and from which specimens of fungi and bacteria have been isolated, but no infection experiments have been carried on.

DISEASES OF FRUITSAPRICOT

Brown rot, Sclerotinia sp., is common <sup>on</sup> apricots, but to much less extent than on peaches. Estimated loss 3 per cent.

GRAPE

Ripe rot is destructive in the vicinity of Nanking and samples have been received from other regions. The fruit spot resembles very closely the anthracnose disease as described in America. (Note: The specimens submitted showed the anthracnose fungus Sphaceloma ampelinum D By. (Gloeosporium ampelophagum (Pass.) Sacc.)



Estimated percentage losses:Ripe rot, Gloeosporium sp. ? - - - - - 7Anthracnose, Spaceloma ampelinum D By. - - - - - 5MULBERRY

This crop is very important in the silk industry. Powdery mildew, Phyllactinia corylea (Pers.) Karst., appears in the late summer and fall and completely covers the leaves. It is questionable, however, how much loss this disease causes.

PEACH

On the peach, brown rot is by far the most destructive disease. Leaf curl is also common, especially around lake regions. There is a leaf spot (shot hole) which looks like the leaf spot in America, caused by Bacterium pruni. No isolations have been made. (Note: The specimens submitted with this report looked more like insect or spray injury than like shot hole caused by B. pruni.)

Estimated percentage losses:Brown rot, Sclerotinia sp. - - - - - 11Leaf curl, Taphrina sp. - - - - - 3

Leaf spot, undetermined - - - - - 3

PEAR

The most destructive disease of the pear in this region is rust. There are two species, one of which apparently goes to the red cedar, Juniperus chinensis. The second species is common in the region around Kaifeng, Honan. Around Nanking it has been observed that the rust comes on so early in the season

that it completely defoliates the young trees. Pear growing in this region, therefore, is very unsuccessful.

Estimated percentage losses:

Blight, probably <u>Bacillus amylovorus</u> (Burr.) Trev. - -	1 to 4
Rusts, <u>Gymnosporangium</u> spp. - - - - -	15

STRAWBERRY

Leafspot, Mycosphaerella fragariae (Tul.) Lindau, is severe.